P2002-77879

(54) [TITLE OF THE INVENTION] VIDEO MONITORING METHOD AND VIDEO MONITORING SYSTEM

(57) [ABSTRACT]

[PROBLEM] To provide a video monitoring method which can reproduce shooting environments which are the completely same as those at the time of shooting a video of an object to be monitored in past times when a video of the object to be monitored is shot, and a video monitoring system using the method.

[SOLVING MEANS] Setting information about shooting environments set at the time of shooting an object to be monitored is added to a video of the object to be monitored so as to be recorded together with the video by recording means, and shooting environments at the time of shooting the object to be monitored are set based on the setting information added to the video recorded by the recording means.

[CLAIMS]

[Claim 1] A video monitoring method comprising:

adding setting information about shooting environments set at the time of shooting an object to be monitored to a video of the object to be monitored so as to record the setting information together with the video by means of recording means; and

setting shooting environments at the time of shooting the object to be monitored based on the setting information added to the video recorded by the recording means.

[Claim 2] A video monitoring system comprising:

shooting means which shoots an object to be monitored;

recording means which adds setting information about shooting environments set at the time of shooting the object to be monitored by means of the shooting means to a video shot by the shooting means so as to record the video; and

setting means which sets shooting environments at the time of shooting the object to be monitored by means of the shooting means based on the setting information added to the video recorded by the recording means.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[Technical Field to Which the Invention Belongs]

The present invention relates to a video monitoring system which monitors an object to be monitored using a video of the object to be monitored.

[0002]

[BACKGROUND ART] For example, in a video monitoring system which monitors a desired object to be monitored using a video (any one of a still image and a moving image may be used) shot by remotely controlling a camera having turning and zooming functions, while the camera is being turned, zooming in and out according to a user's instruction so as to enlarge and reduce the object to be monitored, the camera can shoot the object to be monitored in any directions and at any angles. However, it is not easy to check environment set values of positions, directions and magnifying powers of the camera at the time of shooting such videos at a later date.

[0003]

[Problems to be Solved by the Invention] When a past state and a current state of the object to be monitored are compared with each other using the videos shot by such a camera, it is desirable to shoot the current state of the object to be monitored at the same environment setting as that at the time of past shooting in order to read a change of the object to be monitored accurately. However, since positions, directions and magnifying powers of the camera at the time of shooting and recording the videos in past times are not clear, when the current state is shot, the shooting environments in the past state cannot be reproduced. For this reason, it is difficult to compare the past and current states of the object to be monitored with each other using only the videos.

[0004] It is, therefore, an object of the present invention to provide a video monitoring method which can reproduce shooting environments (positions, magnifying powers, and the like of a camera) which are the completely same as those at the time of shooting videos of the object to be monitored in past times when a video of the object to be monitored is shot, and a video monitoring system using the method.

[0005]

[Means for Solving Problem] A video monitoring method of the present invention is characterized by including: adding setting information about shooting environments set at the time of shooting an object to be monitored to a video of the object to be monitored so as to record the setting information together

with the video by means of recording means; and setting shooting environments at the time of shooting the object to be monitored based on the setting information added to the video recorded by the recording means.

[0006] According to the present invention, when a video of the object to be monitored is shot, the shooting environments (positions, magnifying powers and the like of a camera) which are the completely same as those at the time of shooting a video of the object to be shot in past times can be reproduced.

[0007] A video monitoring system of the present invention including: shooting means which shoots an object to be monitored; recording means which adds setting information about shooting environments set at the time of shooting the object to be monitored by means of the shooting means to a video shot by the shooting means so as to record the video; and setting means which sets shooting environments at the time of shooting the object to be monitored by means of the shooting means based on the setting information added to the video recorded by the recording means.

[0008] According to the present invention, when a video of the object to be monitored is shot, the shooting environments (positions, magnifying powers and the like of a camera) which are the completely same as those at the time of shooting a video of the object to be shot in past times can be reproduced.

[0009]

[MODE FOR CARRYING OUT THE INVENTION]

An embodiment of the present invention is described below

with reference to the drawings.

[0010] FIG. 1 illustrates a configuration example of a main section of a video monitoring system according to the embodiment.

[0011] A camera 1 is for acquiring video pictures of an object to be monitored. The camera 1 is attached to a supporting pedestal 2 for locating the camera 1 so as to be turned within a previously limited range and moved to an up-down direction and a right-left direction.

[0012] An operating section 6 is connected to a control section 3, and is used for mainly inputting instructions for zooming in and out into the camera 1, and instructions for turning direction and angle, and moving amounts in the up-down direction and the right-left direction to the supporting pedestal 2 via the control section 3.

[0013] The control section 3 controls the camera 1 and the supporting pedestal 2 based on instruction inputs from the operating section 6 (outputs control signals to the camera 1 and the supporting pedestal 2) at the time of recording, and sets a position and a magnifying power of the camera 1 at the time of recording a video. Further, the control section 3 executes a predetermined process on video signals input from the camera 1, adds the values used for the setting of the position and the magnifying power of the camera 1 (as additional information), and generates image data for recording so as to record the data on a recording medium 4 such a CD-ROM. Further, the control section 3 reads the image data recorded already on

a recording medium 7 such as a CD-ROM so as to separate the image data into additional information and a video signal at the time of reproducing. The control section 3 controls the camera 1 and the supporting pedestal 2 based on the separated additional information, and executes a predetermined reproducing process on the separated video signal so as to display it on a monitor 8. The control section 3 can reproduce the image data recorded on the recording medium 7 and record the image data on the recording medium 4 simultaneously. That is to say, a current video shot by the camera 1 whose position and magnifying power are set based on the additional information separated from the image data at the time of reproducing is displayed on a monitor 5. Further, the values used for the setting of the position and the magnifying power at this time are added to the video signal currently acquired as the additional information, so that image data for recording is generated and is recorded on the recording medium 4, and then a past video obtained by reproducing the video signal separated from the image data is displayed on the monitor 8. As a result, an operator of this system can compare the past video recorded on the recording medium 4 with the current video shot by the camera 1.

[0014] The description refers to a case where the control section 3 executes, for example, MPEG-1 standard video coding and decoding processes on the video signal input from the camera 1, and adds the additional information as user data defined on a GOP (group of picture) layer in an MPEG-1 standard video signal multiplexing process.

[0015] A recording operation of the video monitoring system in FIG. 1 is described below with reference to a flowchart shown in FIG. 2.

[0016] In order to shoot a video of an object to be monitored, the operator of the video monitoring system performs a predetermined operation through the operating section 6 so as to input instructions of the rotating direction, the rotating angle and the moving amounts in the up-down direction and the right-left direction of the supporting pedestal 2, and inputs an instruction of zooming-in or zooming-out to the camera 1. The control section 3 outputs control signals to the camera 1 and the supporting pedestal 2 based on the instruction inputs, and sets a position and a magnifying power of the camera 1 (step S1). At this time, set values of the camera 1 and the supporting pedestal 2 are used as the additional information.

[0017] Thereafter, when the operating section 6 instructs the camera 1 to acquire a video, input of the video signal from the camera 1 is started (step S2).

[0018] The control section 2 outputs the video signal input from the camera 1 directly to the monitor 5 so as to display it on the monitor 5, and executes arithmetic processes for compressing information amount (DCT (Discrete Cosine Transform), quantization, motion compensation, bilateral prediction, and the like) on the video signal (step S3). The control section 2 performs hierarchical structure coding and variable length coding of the MPEG1 video on the compressed data, so as to generate an image data format of the MPEG1 video. At

this time, the additional information is set in the user data on the GOP layer in the image data hierarchical structure (step S4). The generated image data is recorded in the recording medium 4 (step S5).

[0019] Also after the input of a video from the camera 1 is started, every time when the position or the magnifying power of the camera is changed, the set values as the addition information are set, as the user data at step S4.

[0020] A reproducing operation of the video monitoring system in FIG. 1 is described below with reference to a flow chart shown in FIG. 3. At the time of the reproducing, in order to compare a past recorded video with a current video, the recording process shown in FIG. 2 is also executed simultaneously.

[0021] The operator of the video monitoring system sets in the system the recording medium 7 which records the past videos therein in order to reproduce the videos of the object to be monitored recorded in past times. When the operator performs a predetermined operation through the operating section 6, the control section 3 starts reading of the recorded image data from the recording medium 7 (step S11). The control section 3 performs the hierarchical structure decoding and the variable length decoding on the read image data (step S12), and extracts the compressed data and the additional information (step S15). The control section 3 executes extending processes such as inverse DCT, inverse quantization, motion compensation and bilateral prediction on the extracted compressed data (step

S13), and outputs the video signal obtained as a result to the monitor 8 (step S14). On the other hand, the control section 3 outputs control signals based on the extracted additional information to the camera 1 and the supporting pedestal 2, so as to set the position and the magnifying power of the camera 1 (step S16). The control section 3 records the video signals input from the camera 1 whose position and magnifying power are set in this manner onto the recording medium 4 similarly to FIG. 2.

[0022] As described above, according to the embodiment, the setting information about the shooting environments such as the position and the magnifying power of the camera 1 set at the time of shooting an object to be monitored is added as the additional information to the video of the object to be monitored, and is recorded together with the video on the recording medium 4. When a current video is shot, the shooting environments such as the position and the magnifying factor of the camera 1 are set based on the additional information added to the video recorded on the recording medium 4. As a result, when the current video is shot, the position and the magnifying power of the camera 1 which are the same as those at the time of shooting past video can be reproduced, so that the object to be monitored in the past video can be easily compared with the object to be monitored in the current video.

[0023] In the above embodiment, the case of the video monitoring of moving images is described as an example. However, also in video monitoring of still images, the additional

information is embedded into JPEG compressed data and is recorded on the recording medium 4, and thereafter when the video recorded in past times is reproduced, the position and the magnifying power of the camera 1 are set based on the additional information added to the video, and a current video of the object to be monitored is acquired newly by the camera 1. As a result, when the current video is shot, the position and the magnifying power of the camera which are the same as those at the time of shooting the past video can be reproduced. For this reason, the object to be monitored in the past video can be easily compared with the object to be monitored in the current video.

[0024] In the above embodiment, the position information and the magnifying power of the camera 1 are described as the setting information about the shooting environments to be added as the additional information to a video, but the additional information is not limited thereto. Various parameters used for setting the other shooting environments may be used as the additional information.

[0025] Further, the present invention is not limited to the above embodiment, and thus can be variously modified within a scope without deviating from the gist at the carrying-out stage. Further, the embodiment includes the inventions at various stages, and the various inventions can be extracted by suitable combinations of a plurality of constituent features disclosed. For example, even if some constituent features are deleted from all the constituent features in the embodiment,

when the problem (at least one) described in Problem to be Solved by the Invention can be dissolved, and when the effect (at least one) described in Effect of the Invention can be produced, the constitution from which the constituent features are deleted can be extracted as the invention.

[0026]

[Effect of the Invention] As described above, according to the present invention, when a video of an object to be monitored is shot, the shooting environments (position, magnifying power and the like of a camera) which are the completely same as those at the time of shooting a video of the object to be monitored in past times can be reproduced.

[Brief Description of the Drawings]

[FIG. 1] FIG. 1 is a diagram illustrating a constitution example of a video monitoring system according to an embodiment of the present invention;

[FIG. 2] FIG. 2 is a flow chart for describing a recording operation of the video monitoring system;

[FIG. 3] FIG. 3 is a flow chart for describing a reproducing operation of the video monitoring system.

[Explanations of Numerals]

1: camera

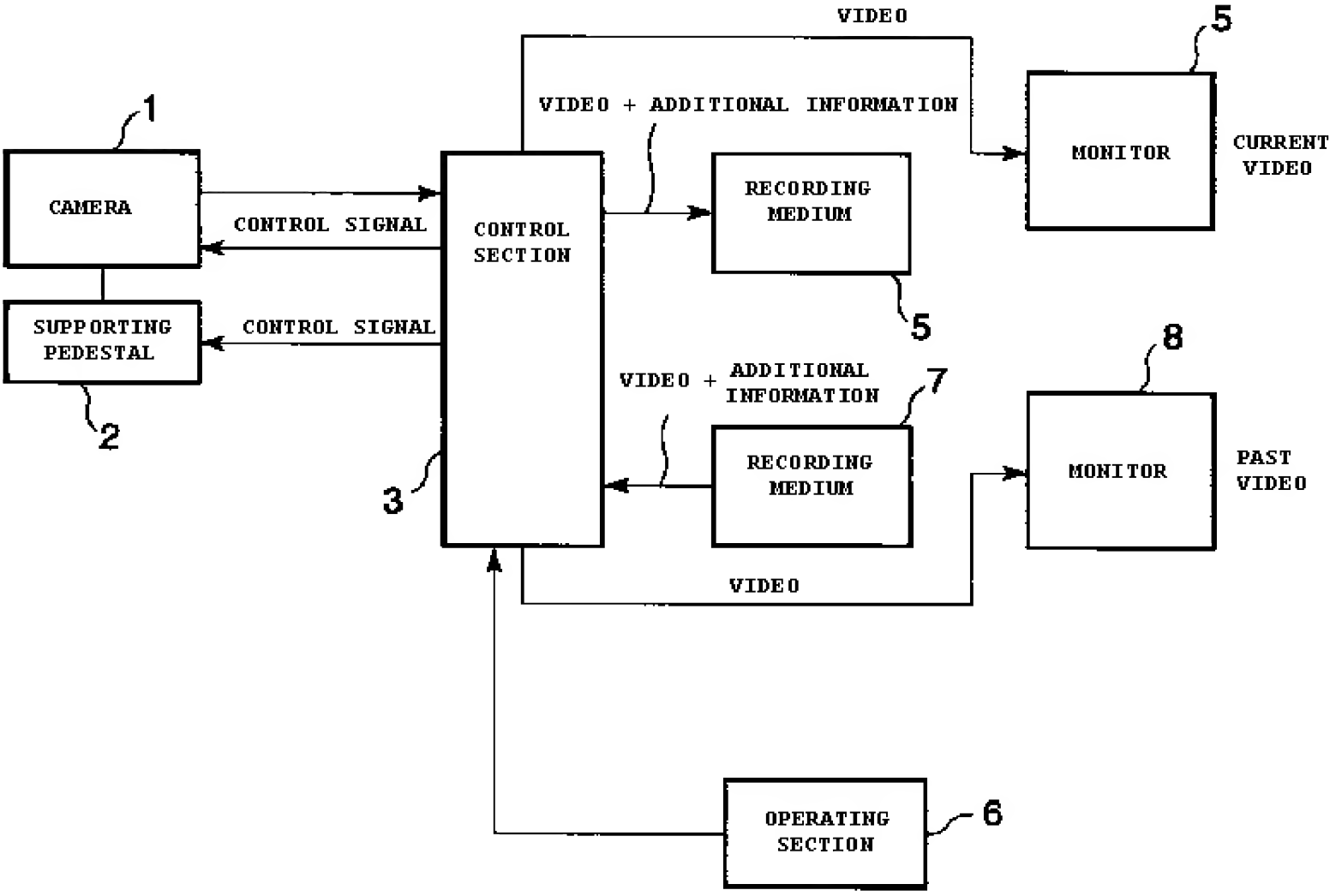
2: supporting pedestal

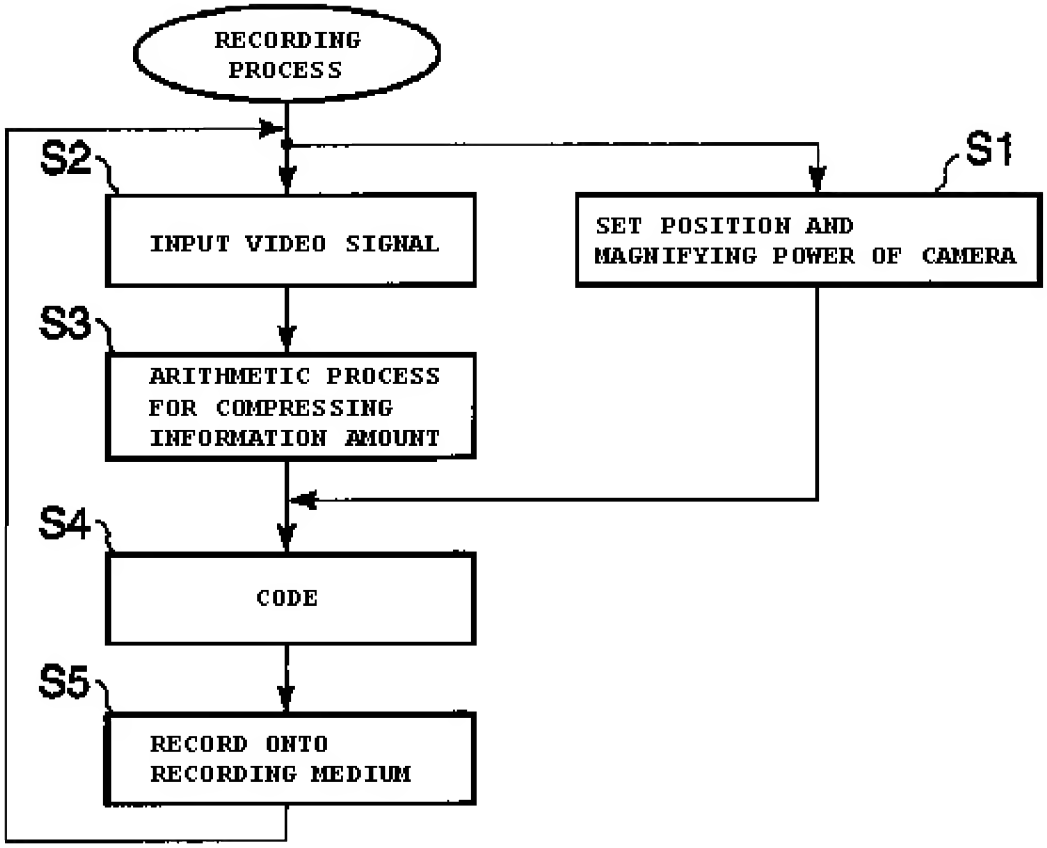
3: control section

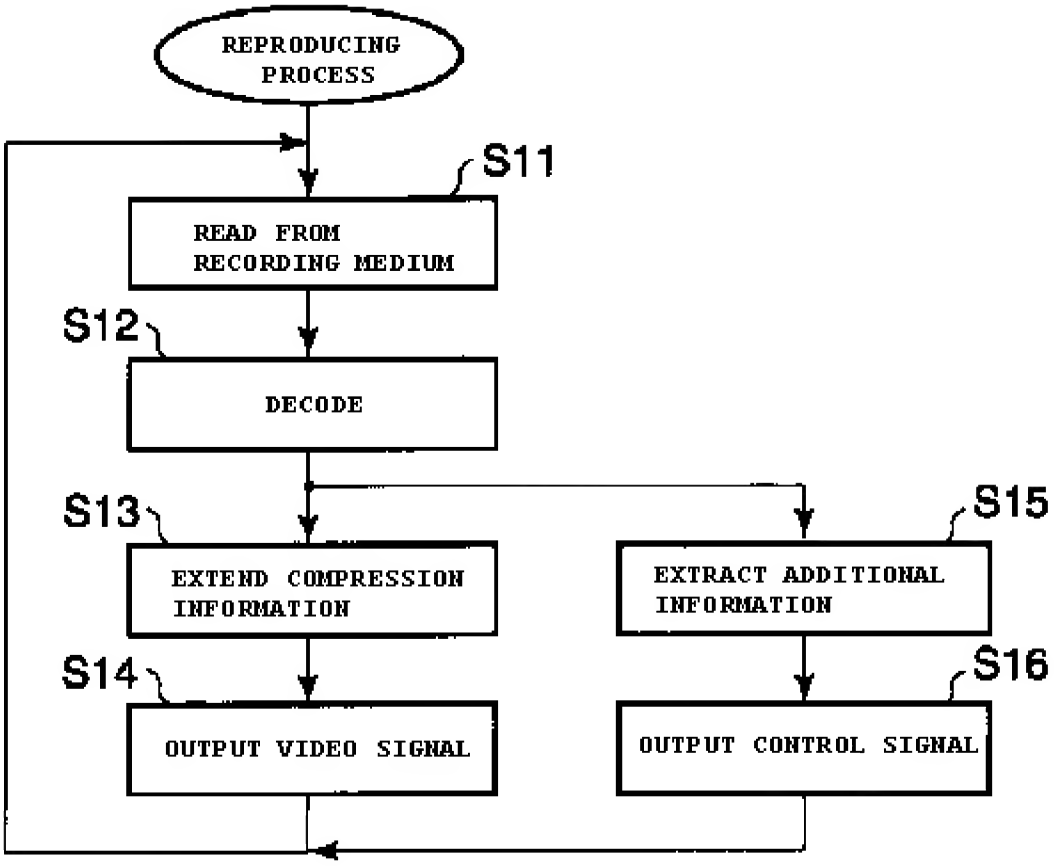
4, 7: recording medium

5, 8: monitor

6: operating section


VIDEO
5
VIDEO + ADDITIONAL INFORMATION
1
CAMERA
CONTROL SIGNAL
CONTROL SECTION
RECORDING MEDIUM
MONITOR
CURRENT VIDEO
SUPPORTING PEDESTAL
CONTROL SIGNAL
5
8
VIDEO + ADDITIONAL INFORMATION
7
2
3
RECORDING MEDIUM
MONITOR
PAST VIDEO
VIDEO
OPERATING SECTION
6


RECORDING PROCESS
S1
SET POSITION AND MAGNIFYING POWER OF CAMERA
S2
INPUT VIDEO SIGNAL
S3
ARITHMETIC PROCESS FOR COMPRESSING INFORMATION AMOUNT
S4
CODE
S5
RECORD ONTO RECORDING MEDIUM


REPRODUCING PROCESS
S11
READ FROM RECORDING MEDIUM
S12
DECODE
S13
EXTEND COMPRESSION INFORMATION
S14
OUTPUT VIDEO SIGNAL
S15
EXTRACT ADDITIONAL INFORMATION
S16
OUTPUT CONTROL SIGNAL